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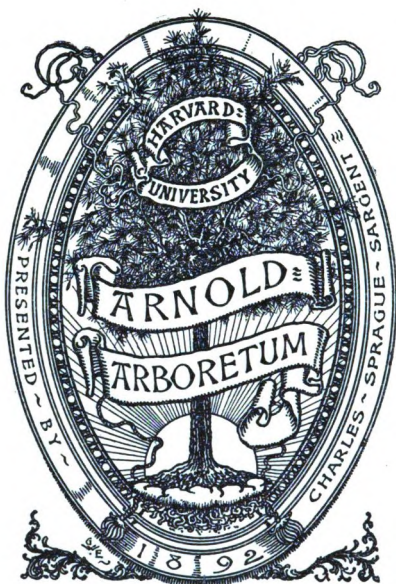
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"I agree with you upon the very great importance of the subject of Forestry, and shall be very glad if you can induce our countrymen to give it an increased attention."—W. E. GLADSTONE.

# THE Strength and Decay of Nations

I.—FORESTRY.

II.—BRITISH FORESTRY.

BEING TWO ESSAYS WITH NOTES.

BY

GILES ANDREW DAUBENY,

*Of the Middle Temple, Barrister-at-Law. A Founder of the  
Marine Biological Association of the United Kingdom,  
and a member of the Selborne Society.*

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# PREFACE.

I.—FORESTRY.

II.—BRITISH FORESTRY.

These two articles were written without any intention of their appearing together; there is some repetition in the second, which it has been thought best to let remain. The greater part of the first paper appeared in "Nature Notes," the magazine of the Selborne Society, during the months of October and November last: it was dated August 24th, 1898, before the day of Omdurman and the Fashoda incident.

G. A. D.

*March, 1899.*



*"The tree of the field is man's life."*

I.

FORESTRY.

**P**RACTICAL forestry has been defined by Mr. Michie as signifying the growing of the greatest quantity of the most valuable wood or timber upon the smallest piece of ground in the shortest period of time. This may suffice very well for forestry as practised in Scotland; but when we consider the manner in which the science is applied in countries nearer the sun, some addition becomes necessary. The full practice of forestry then further implies the maintenance in a given country of the proportion of woodland suitable to that country, that there may be the best climate obtainable in that country for the maintenance and reproduction of animal and plant life conformably with the wants and enjoyments of man. It may be added that forestry, so carried out, amongst other benefits, regulates the rainfall, prevents to a large degree violent storms



and drought, and diminishes disaster and discomfort by floods and drifting sand.

The *science* of forestry, however, has only been known for some two hundred years, yet its great importance is seen when we consider what takes place in every country as it becomes civilised.

Whilst in barbarous times men are content to live upon the wild fruits of the forests and plains, the spoils of the chase, the food to be obtained by trapping and fishing, and what can be wrested from neighbouring tribes or travellers by force of arms; as soon as they gain ideas of civilisation they clear a space amidst the trees of the forest to build a collection of dwellings and to grow corn and other food and provender in greater quantity than can be conveniently gathered in the wild state. Wood, moreover, is required for firing, to build houses, boats, and for many other purposes; so it comes to pass that the area around the settlement denuded of trees becomes greater and greater.

Where a civilised invading force occupies a land covered with primeval forest, then, of course, the cutting down of trees goes on at a much accelerated pace.

One result of civilisation generally, then, is the gradual but steadily increasing disappearance of trees, a few remaining, and man planting some fruit and other trees that he sees will be of use to him : the forests are destroyed with most disastrous results, involving the ruin of climate favourable to life, and so the impoverishment and eventual downfall of once powerful nations.

Such has been, and is still, in too many cases, the usual course of events. Most, however, of the nations of Europe have learnt the value of forestry, and some of them practise it so thoroughly that a proper proportion of their land is kept covered by trees ; so that there are equable seasons, and agricultural operations can be performed with the greatest possible success.

Now let me take the case of a country completely, or almost completely, denuded of trees, say a *hilly* portion of the interior of the Sahara desert—for that region is by no means a flat expanse of sand, as we were told not so many years ago. I will suppose that a large body of cloud, containing sufficient moisture to produce abundant rain in England, approaches this piece of almost rainless desert :

the heat radiated from the surface of this hot locality, and the heated air rising from it, will carry the cloud upwards into attenuated atmosphere and dissipate it into such fine vapour that there will be no rainfall; and this is what usually happens during the greater part of the year.

Next let it be supposed that the cloud is driven towards a hilly desert region so situated, say near the sea, that rain falls on it less rarely than in the former case, for the land is not so much heated as the more central desert, and when the clouds are very heavily charged they will resist the smaller upward pressure of less heated air. The rain falls violently on the hills, a little of it soaks in, to be evaporated directly the cloud is gone, by the sun's rays, whilst the greater part runs from the sides of the hills as from the roof of a house, fills the hitherto dry water-courses with raging torrents, and floods the valleys and plains in its impetuous rush towards the sea.

Lastly, I will take the case where the cloud comes to a land with the hillsides covered with their natural clothing of trees, but where, in the lower parts of the valleys, and in the plains, the forest has been cleared away and

the greater part is under cultivation : there are plantations here and there where the ground is unsuitable for grass or tillage ; and orchards of fruit trees and pleasant gardens abound. Such a country has running streams and rivers, and though the cultivated ground has been artificially drained by man, there is sufficient moisture everywhere for the maintenance of life in trees and plants : water is retained in the forests, and from them, from the rivers, ponds, and streams, as well as from every square foot of ground, arises continually more or less watery vapour. The approaching cloud meets this ascending vapour, it meets the trees on the hills, it encounters the cool sides of the hills—there is a downfall of rain. Then the water, instead of rushing violently down the hills, is to a large extent retained upon them amidst the trees, their roots, and the undergrowth, and the trees protecting the earth from the rays of the sun, the soil acts as a sponge, and the water remaining in the woods on the hills, is given off gradually to the streams and rivers. Here is a perfect system, here is Nature modified to suit the wants of man.

I have read many times that trees *bring* rain, but how they do so is but imperfectly

understood. However that may be, we have here a sufficient explanation for our present purpose. Trees seem to be made to take from clouds their moisture. If we watch clouds drifting through trees we notice, when they have passed, that the trees are wet and dripping: if the clouds are above the trees, other conditions being favourable, the vapour that constantly rises from every wood will (by the law of cohesion) detain them and uniting with them the clouds become overcharged and rain descends. Perhaps it cannot be truly said that trees bring rain; but they and the moisture that surrounds them, and without which they do not exist, arrest the watery vapour in the atmosphere so as to cause rain to fall. Besides, by the law of gravitation, the moist vapour that lies in and hovers above the forest, must attract passing clouds floating in the surrounding atmosphere, and trees themselves must do the same to some extent.

Living a mile from the sea, as I do now, and a few miles from the New Forest, clouds coming from the sea frequently drift through my garden, just wetting the trees, without any rain falling, but on their reaching the forest there will be a downpour.

Forests, it must not be forgotten, are of the greatest service to man in making leaf-mould, which when washed down to the lower levels produces fertile lands, as in the case of river deltas, or enriches a country as the waters of the Nile do, when they overflow and deposit a rich mud formed from leaves, mosses, decayed wood and such like. The wash down from bare hills is not only useless but destructive when it covers up land under cultivation.

From what has been said it must be evident that if, under the impulse of civilisation, man entirely destroys the forest, except in special situations, he so ruins the climate and altogether causes such mischief that he destroys agriculture and makes the land unfit for human habitation. Yet this is exactly what has happened in a greater or less degree throughout nearly the whole world.

Let us cast our eyes along those countries that are seen on the map surrounding the Mediterranean Sea, that central water that ever must be the common highway of civilised mankind. We commence with Spain, a country whose climate has been destroyed by the drought ensuing from the cutting down of the forests, and whose prosperity has steadily

declined with the consequent failure of agriculture. The centre of the peninsula is almost treeless, alternate hot and cold blasts sweep unchecked over it, the fat of the land has evaporated and is not reproduced, the earth is dust. It may be fairly said that had Spain expended in the restoration of her forests the sums she has squandered during the last fifty years in the island of Cuba, she would already be seeing much improved days. What a power she was, and what a power she may again become, with her fine frontier, if she will only replant her forests. Yet Spain is not the most backward country in Europe in the matter of forestry; that post of distinction belongs to a people that will be dealt with last. The Spanish have an excellent school of forestry at San Lorenzo del Escorial, near Madrid, and were sufficient funds forthcoming, no doubt a vast amount of good practical work would be done.

Next comes France, at this day an enlightened country as regards forestry, and whose famous enterprise of planting with pines a desolate and unhealthy district of one and a half million acres in extent on the "Landes" not far from Bordeaux, with the

result that after thirty years and thenceforth, it maintains in prosperity a population of one and a half million people instead of a few thousand paupers as formerly, is pointed out to all students of forestry as a record performance. Gaul, we read, was in Cæsar's days covered with dark forests, broken here and there by cultivated clearings, but later the slopes of Provence and Rousillon were denuded of wood, and stood bare, as did Greece, this last-named country, be it observed, having been *civilised* at an earlier epoch. The great French school of forestry at Nancy is well known, and there are many other schools throughout the country teaching the same science. The French, however, are not always consistent, and Sir John Lubbock tells us in *The Beauties of Nature*, how two departments—the Hautes and Basses-Alps—are being ruined by the destruction of forests.

The next country is Italy, the centre of that once mighty empire that held the Mediterranean Sea as a Roman lake. We ought to expect great things here, and great things we shall find, for it was the neglect of forestry that caused the downfall of Rome from her position as the mistress of the world; and it



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is its continued neglect that keeps Italy poor. The real strength and backbone of a nation consist in its having a large and healthy rural population: from such people alone can great and powerful armies be raised. When the Romans gradually destroyed their forests, as every other power had done before them to their own destruction, rain became scanty, streams dried up, and their climate became hot and sultry, agriculture declined, work in the fields diminished, the country people became poor, idle, and ill-fed, and steadily deteriorated in physique, they decreased in numbers, many of them crowded into the towns, and the manly virtues disappeared. Then were there no strong right arms at home to defend the heart of the empire, and Rome had to rely on foreign and colonial mercenaries, and the help of doubtful allies, with what result all students of history know well. I could quote much to show to what a vast extent Roman forests were cut down, but space will allow but one line from Marny, the French writer, "The great plain of the Po is completely divested of forests, there is not a single conifera in it." The floods in Italy, that were in November, 1896, so destructive to life and

property, were the result of the trees having been removed from the sides of the mountains. But modern Italians are not all ignorant of the cause of such disasters, for they have a forest school at Vallombrosa.

Now we come to Germany, whose territory, it is true, does not touch the Mediterranean, though German people speaking the language of the Fatherland inhabit the country from the frontiers of the empire to the port of Trieste. The home of forestry is Germany, and here we look for the best methods of forest management. The science has been a progressive one, and whilst anything like a description of present or former systems must be left for other possible occasions, I may say here—quoting the late Dr. J. C. Brown—that “In the advanced forest economy of the Continent reliance is placed upon natural reproduction by self-sown seed; and artificial sowing or planting is employed only to fill spaces which may have been left blank in this process, and in the creation of new forests as in the reboisement of mountains, or the fixing and utilisation of drift sands.” The Royal Forest Academies of Prussia are situated, one at Eberswalde, near Berlin, and the second at Münden, not

far from Cassel, and in Saxony, Wurtemberg, Baden, Bavaria, and other States are to be found similar State institutions. Austria has no less than nine Imperial Schools.

A residence of two years in the interior of Germany has convinced me that had not the people of that country taken in hand seriously, as they did at the commencement of the 18th century, the maintenance and re-growing of their forests, the land would long ere this have become worse than Spain (which has the sea round it for the most part to moderate, to some extent, the drought), the climate would have greatly suffered, the population would have diminished and deteriorated, and no conquering armies would have crossed the Rhine in 1870. The question has sometimes been asked: "Will the newly-created German Power last?" The answer can be at once given: "Certainly, she replants and maintains her forests; the national stability rests upon a sure foundation—the preservation of the forests, and so of agriculture."

Greece next claims our attention, where Plato, four centuries before the Christian era, lamented the loss of the shady forests of earlier times. This country, once so rich in trees, had

almost entirely lost them before the Roman epoch. The upper part of the Balkan peninsula has fortunately escaped some of the evils of civilisation, and Servia and Bosnia, for instance, have beautiful forests. But the isles of Greece have suffered sadly : Crete, left with a few olive trees, has now lost nearly all those during the recent troubles. The Cyclades were long ago cleared of trees, and the same work has gone on in the Ionian Islands. As to Cyprus, when Mr. Chamberlain received a deputation at the Colonial Office at the beginning of 1897, Sir George Birdwood, after referring to the experience he had had in India, said that it was imperative in this island, as it had been found in India, to re-afforest the country, which would improve its climate and give natural irrigation.

Russia is very reckless about forests. Peter the Great, in his day, used to hang up by the road side those of his subjects whom he caught destroying the trees. But the evil continues to this day. There is no efficient system of re-planting ; factories are established and remain *in situ* as long as there is wood to burn in the furnaces ; they then are moved on. So vast tracts of land have become bare of trees, the

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soil, having no shelter from the sun's rays, burns up, and great navigable rivers have run dry. The mischief is so serious that Germans see that the climate of their own country suffers. One can see at a glance this *may* mean war. But the matter goes further than this: with Russia becoming a waste, the population must move somewhere, and this is the excuse for the Muscovite bear extending his arms, according to traditional policy, around the shores of the Black Sea. Here also is the reason for Russian designs on India and China, and for her now shipping thousands of people to Manchuria. Let all nations beware of such a destroying power as this. The same thing had to be dealt with before when the Turks, coming from the deserts they had made in the East, endeavoured to overrun Europe. The absence of trees is the cause of unrest amongst men.

Asia Minor has still fine forests in the northern mountains, but the central plateau is almost destitute of wood, and so of water. Syria presents a sad spectacle: the Biblical history tells us of the early fertility of this land; but in these days the cedars of Lebanon are represented by a few solitary specimens,

and the general aspect of the country is one of poverty and barrenness. Especially is this so around Jerusalem, as has been remarked by M. Renan, who resided for some time in Palestine to gather material for his "Vie de Jesus," and other works. Look at the map, it is covered with dotted lines—these are dry water courses traced through barren desert land, which were once perennial streams running through woods and fertile fields. The Bible names several forests whose sites have been identified, and now present to the traveller's eye nought but rocks and sand. It is idle to suppose that the Jews can possibly go and live in Palestine in any great numbers until the forests shall have been restored to the land, which can not be under the rule of the Turks, who boast that where their mares have left their footmarks the grass never grows again. If, during the changes that are now being planned, Germany obtains Syria and Asia Minor, with the hinterland, it will be for the great benefit of mankind. The forests will be replanted, the trade of the Levant will be re-established. If England has Arabia the same grand work can be further extended, and naturally Constantinople should sooner

or later fall to her as the greatest Mahomedan power on earth.

Persia has lost her forests, excepting a few in the north, and who can doubt that the valley of the Euphrates and Tigris, with its huge cities of ancient days, was then highly fertile with abundance of trees? They have gone, and with them has disappeared the Babylonian power. The cities are buried by the shifting sand of a great desert created by man's folly.

The same story is repeated in Arabia, which Mahomet wished to see replanted, saying the country should be made a garden of trees; and in Egypt we have visible evidence at this day from petrified remains, that the hill slopes on each side of the Nile valley were covered by trees. What a different aspect must that ancient home of civilisation have presented in the early ages to what it does now. I would here recall the fact that since the upper provinces of Egypt fell under the baneful rule of the Khalifa, the date palms, a source of wealth and basis for taxation, have been much reduced in numbers.

One step further brings us to Northern Africa, with its vast desert of Sahara, which was once believed to be the even bed of an

ancient sea, it being only needed to cut a waterway from the Mediterranean or Atlantic to flood it; but now we find that it has a very varied surface, with mountains rising to an altitude of 8,000 feet, beds of dried-up rivers and water not far from the surface in many parts, generally at depths of from 10 to 300 feet, and in abundance. Some of the mountains are snow-capped for three months of the year, and when the snow melts the river-beds are filled with roaring torrents, which are lost in the sand before they get to the sea. This was not always so, the rivers Ighargar and Mya once found their way to the Mediterranean through the *shotts* or salt lakes of Algeria and Tunis. This, with the other information we have, points to the conclusion that this vast territory was once, thousands of years ago, a fertile land, the seat of an ancient civilisation, and that its present condition is to be attributed to the agency of man in cutting down the forests. Those of us who have watched the doings of the French people in Africa know that they have persistently endeavoured, and are now doing their utmost, to obtain possession of the entire land surrounding the Sahara, that they are at this



minute exploiting the desert, opening up fresh trade routes across it, sinking wells and planting trees, and who shall say that within the next two or three centuries the great Sahara may not be again under man's control, with sufficient trees and forests and water in the rivers, and supporting a population numbering its hundreds of millions, instead of the possibly two and a-half millions of the present day?

Indeed, it does not seem to be other than the truth to say that the great expanses of sandy desert are not the result of natural causes, but the result of man's destructive work. Of course there must be portions of the earth without trees: a drive into the Engadine over the Fluela Pass will convince one of this, for as one approaches the pass the fir trees become smaller and smaller till they cease to exist. But when it is suggested that the deserts of Sahara, of Egypt, of Arabia, of India, are natural deserts, I, for one, cannot believe it. All these deserts can and will be, in my opinion, reclaimed by man. These may be large ideas, but they are not too large for scientific Frenchmen, who, let us remember, cut the Suez Canal,

when we said it was an impracticable scheme. The African railways spoken of in M. Zola's "Paris" will ere long be a reality.

This essay will be quite incomplete without some reference to the British Empire. One might expect, with the great extent of our colonies and dependencies, that in England, in the heart of the Empire, forestry would receive the attention that it deserves, but this is not so, and the reason is easy to find. Britain is a moderate sized island, so is Ireland: in no part of either can you get further than 100 miles from the sea, if so far: the consequence is that the air is constantly kept moist, and the climate moderated and rendered more equable than it can be in the interior of great continents. Moreover, the climate is rendered the milder by the warm current of the Gulf Stream, which breaks upon and flows past our western shores: this stream brings with it warm vapours which soon precipitate in rain, and so it comes that for climatic purposes the 4 per cent. of land that we have in England covered by trees, suffices. Our climate is moist and mild enough, generally speaking, without our growing more trees than we do, still there are

many rough or sandy spaces unsuited for grass or tillage, and deserted farms, that might well be turned into forest, to say nothing of the neglect of our orchards in many counties, where replanting is much needed to take the place of old and worn-out trees.

In this connection the report of the Recess Committee on the establishment of a department of Agriculture and Industries for Ireland, made in 1896, recommends the re-afforesting of waste land in that country on a very large scale, and it has been pointed out that had the Government, at the time of the potato famine in 1847, purchased lands that could have been had for quite a nominal figure and planted them, they would now possess great forests, which would have benefited thousands of indigent persons by employing them in planting them, and would now be the support of many more thousands in affluence, whilst the forests would be a source of profit to the State, as they are in India, and ameliorate the climate. It has also been mentioned that much work in forests can be done in winter when the ordinary harvests are past, and there are many hands idle that usually find other out-of-door occupation.

England contains no Government school of forestry as in other European countries, and in the United Kingdom we have insufficient means for training forestry experts. In arboriculture, or the growing of trees for ornamental purposes, we excel all other people, but in silviculture, or forestry proper, we are backward. Scotland pays more attention to forestry, the subject being forced upon her by the rigours of her climate and the bleakness of her hillsides, where trees for shelter are more required than in the southern portion of our island. In India also forestry has been forced upon us: there the climate was found to be going from bad to worse from the constant destruction of forests—imagine 85,000 men in one district engaged in felling, burning and destroying, so as to get one or two crops grown on the spaces cleared,—and during the last half century the matter has been seriously taken in hand, so that we have now an organised forest department of the Indian Government. The officers of that department are trained partly at the Indian School of Engineering at Cooper's Hill, partly with foresters in Scotland, and a portion of the course of study is at one of the foreign schools in Germany or France. This system

has its advantages, for whilst a young man has some difficulty in fully profiting by education abroad in a language not his own, yet it must be remembered that the climate in summer in Central Germany and Southern France is much more like what is experienced in India than anything we are accustomed to at home. That there is room for much to be done in India is shown by this, that whereas in Germany one quarter of the land is under trees, in our Eastern Empire, so far as I can see, the proportion of forest is less.

Can we then wonder at the famine of two years ago? Twenty years before that we were also face to face with a similar calamity, and it was then pointed out by experts in the *Times* newspaper and other periodicals, that the famines that recur in India and other countries from time to time, are due to the thoughtless destruction of forests that had been going on, almost unchecked, for thousands of years. In the *Journal of Forestry*, in 1877, it was said that the little that Government had done through the Indian forest department was as a drop in the ocean, and life and energy was called for to be thrown into the business, and it was stated that the only way to produce

more rain in India and effectually stop famines, was to keep on planting trees till the climate was restored to a proper equilibrium. It was useless to construct reservoirs and irrigation works without creating a supply of water to fill them.

It is much to be regretted, not only that we have no English school of forestry, but also that the rudiments of the science are not taught in every school throughout the country. We pay heavily, it seems, for teaching our children some subjects that are altogether impractical and useless. Were this changed, persons when leaving these shores to seek their fortunes in the Colonies would not look upon the forest as an enemy to be destroyed in reckless fashion, but as a precious possession, of which a proper proportion should be jealously preserved for our own good and the good of those that come after us. Trees in low-lying situations that favour malarious swamps, as at the mouths of some of our colonial rivers, cannot, of course, be too soon removed.

In these days we hear much of Rhodesia and the Chartered Company; the settlers in that country feel the want of shade, and it is satisfactory to observe that Mr. Cecil Rhodes

fully understands the importance of forestry, so we may hope that those who come under his influence may imbibe his foresight in this respect, and that we may soon see that land, where Syrians in the time of Solomon worked the gold mines, and destroyed the forests to make charcoal for smelting purposes, replanted by our colonists.

We English are accustomed to consider ourselves as the only nation that can colonise, and to laugh at the attempts of others; but there is one consolation in Germans, French, and Belgians having a footing in Africa, *i.e.*, they may be trusted to plant trees where they are required, and not to utterly destroy the primeval forest. There is, therefore, some hope that the sources of the Nile are not in too great danger, for no one would relish the idea of that grand river diminishing greatly in volume and losing itself in the desert, instead of its waters passing on by Cairo and discharging into the Mediterranean.

I ought to say that some of our colonies, and notably South Australia, are taking much interest in forestry.

NOTE.—It is worthy of note that the Secretary for the Colonies is thus reported by the

*Daily Telegraph* to have spoken at Manchester on November 16th, 1898, in the following terms:—

“I remember the time when the map of Africa consisted chiefly of a very large blank space which was described as the Desert of Sahara, but now every inch of that space almost is mapped out. At all events, the general features of the territory, are known, all its qualities and its potential capacity. All this has been going on elsewhere. A large portion of those territories, of the value and importance of which we have suddenly become aware, are either in the possession of savage and barbarous tribes, or are under the control of what Lord Salisbury calls a decaying Empire.”

The whole of this and Mr. Chamberlain's recent speeches should be carefully studied by all thinking men. They show that our Government are now aware of the great responsibilities before them. They see that the rule of the Turk must come to an end, the forests to the east and south of the Mediterranean must be regrown to ensure the peace of the world.

The solution of the nearer Eastern question is far closer at hand than most people suppose,



and in my opinion it will be effected almost without bloodshed. Further remarks upon this must be reserved for a time; it is against the interest of my country to say more at present.



*"This happy breed of men."*

II.

BRITISH FORESTRY.

THE general ignorance of English people on forestry would be laughable were it not really in some respects a serious matter. If you talk to a friend about it he will imagine that you are going to speak of a large friendly society, and when you explain to him shortly that a mountain without trees is like the roof of a house, and that the rain falling on it will run off speedily to produce floods in the lowlands, as so often happens; for instance, in Spain, Italy, and Greece; that the absence of trees allows the soil to be burnt up by the rays of the sun, so that the sources of streams are destroyed, large rivers become dried up, and agriculture languishes for want of moisture, causing famine, he says, "Oh! that is very interesting, but I never thought of it before." Or, if you ask another acquaintance who has recently returned from India about

forestry in that country, he will say, vaguely, that he had heard that the climate there had suffered and timber had begun to fail from trees being cut down too much, but now there is an organised Forest Department of the Government who attend to this.

But if you ask a German about forests, he will at once tell you that without them his country could not get on at all; that unless a considerable proportion of the land were kept under trees the climate would alter and the possibility of the existence of Germany as a great nation would be gone—as a matter of fact about a quarter of the country is forest—he would add that the Russians cut down too many trees and do not reproduce them, that they are thus ruining their own country and slowly but surely turning it into a desert, and in doing this they are damaging the climate of their neighbours' territory, and in particular the Eastern Fatherland. He will also tell you that we are all right in the British Islands, with the sea all around us, and nowhere more distant than one hundred miles, to ensure plenty of rain and moisture; and that we can comparatively cut down almost as many trees as we like, and only plant them for ornament,

pleasure, or sport, but significantly asks :  
"What about India and your Colonies?"

It will be here convenient to state that the area of the British Islands is about seventy-seven million acres, of which nearly three million are covered by trees. The area of Great Britain is about fifty-six million acres with two-and-a-half million acres, or about 4 per cent. of woodlands. Ireland has some twenty million acres, of which three hundred and thirty thousand are forest, the proportion being less than 2 per cent.

Why this difference between the two islands in the proportion of woods? Why should England have one acre in twenty-five under trees, and Ireland but one in sixty? Some will say that in the latter country people are foolish to reduce their trees to the extent that has been done, others that the Irish are wise and have destroyed their forests to get more room for pasture. Both replies are partly true, and the real answer is that the trees in Ireland, as in every other country, were formerly cut down as they were wanted for use and as space was required for agricultural purposes without anyone thinking about the consequences.

These consequences are different according to situation; in continents at all distant from the North or South Poles deserts are produced, but in islands of small or moderate size far from the Equator the results, in a climatic sense, are insignificant. Great Britain prospers with four per cent. of woodlands; Russia in Europe with about forty per cent.—which proportion she is reducing—is always liable to disastrous famine.

No general system of the reproduction of woods and forests exists in Great Britain or Ireland. It is true that the Scotch understand forestry better than the English or Irish. In their country they have taken up the science with some earnestness, and sow and plant trees not only for shelter but also for profit. Fortunately for us in the remainder of the British Islands (except on the West Coast of Ireland), we do not require a great deal of shelter, and for climatic purposes the proportion of trees that we have suffices tolerably well; there is a sufficient rainfall without our planting trees to produce more. Still it is by no means certain that this state of things will continue, for the amount of drainage that has been carried out in recent times must con-

siderably reduce the moisture of our climate; and that our present woodlands might be better managed and their area considerably increased with advantage to ourselves and to those who will succeed us will be evident from what follows.

It was elicited by the Select Committee of the House of Commons, which sat 1885-7, that large tracts of land in the United Kingdom, especially in Scotland, and Ireland, and Wales, might be planted with advantage, that the management of our woodlands in the British Islands might be materially improved, and that the then depressed values rendered economical and skilful management the more important. The report also stated that as regards the Crown forests, comparatively small as they are, the difference between skilled and unskilled management would itself more than repay the cost of a forest school. The British Empire throughout the world has a greater extent of forest than any other nation.

The Committee regarded, and regarded perhaps rightly, the science of Forestry *in the British Islands* as secondary to Agriculture, but when we consider the Empire at large the case is altogether different, and we have to ask

ourselves if we here, in the heart and centre of our vast dominions, are justified in continuing to send out to distant parts of the globe, under the burning sun, men utterly ignorant of the value of trees in a climatic sense. Some may say that the Colonies can take care of themselves. Perhaps they are right, or partly so, but still in these days, when we talk so much of drawing the different parts of the Empire together, it does seem natural that when some of the Colonies are in want of experts to look after their forests they should be able to obtain a supply of such men from home, holding the diploma of a British School of Forestry. The Colonies send law students to the Inns of Court in London to keep terms, pass examinations, and be called to the bar, but in forestry there are no such facilities.

Secondary to agriculture as forestry may be in the home country, I altogether dissent from the idea suggested more than once in the Committee-room, that the science of forestry might be learnt in a few months. The life of a forest tree is far longer than that of a man (I do not count childhood), and even the fastest growing, for example the larch, will not make timber till 60 years of age. The elements of the theory

of forestry could be learnt, no doubt, from a good text-book in a short time, and from it could be ascertained what accessory sciences should be studied by an intending manager of woodlands; but let us take the syllabus at Downton Agricultural College for the forestry class; it is somewhat extensive, as Professor Wrightson tells, and includes, *in addition to the teaching in agriculture*, the history, propagation, treatment, uses, and value of timber trees; management and valuation of underwood; the planting, thinning, and general management of plantations; the measurement of standing, felled, and converted timber; the use of the sliding scale; the sale of timber and underwood; the economy of woods and forests; and the management of estates.

An upper forester must have a competent knowledge of botany, zoology, mathematics, natural history, chemistry, geology, physics, entomology, and other kindred sciences—these, or most of them, are taught in agricultural colleges. The forester should be able to at least read, if not to speak, French and German, so that he may learn, without difficulty, the progress of the science of his profession in foreign lands. Moreover, travel is most desir-



able for a forester. Then, as to the practical part of learning. Experiments, from the nature of trees and the time they take to mature, must be prolonged, so that it takes a long life for a man to become anything like perfect in the profession. Nor must it be forgotten that forestry is a new science only two hundred years old, so that there is much room for experiments.

It is generally felt that two years at least should be spent by the student at a forest college, and that for the rest of his life the forester will remain a student, ever gaining valuable experience and carrying out work, under the best known systems, to be completed by his successors; he will also complete much good work himself, such as planning and carrying out schemes for planting, draining, or fencing new plantations; and he will have the satisfaction of reaping the harvest of trees planted many years before he was born. Of all sciences this may be said to require prolonged work and study, and it has every other natural science connected with it and further knowledge as well. An upper forester should be a scientist of the first grade and a practical worker as well; nor should the ordinary wood-

man be altogether ignorant of the science that should direct his work. New as this science is, many definite rules of practice have been arrived at and are put in force in Germany, France, India, and other countries with the greatest success, so that a considerable profit is made from the woods. Space will not permit of more being said here on this part of the subject, which must be reserved for a future occasion.

England has no forest school, strictly speaking. Students for the Indian forest department are well trained at the Royal Engineering College at Cooper's Hill, but are limited in number. At the agricultural colleges at Cirencester and Downton there are forestry classes in which excellent instruction is given so far as it goes, but it is not pretended to be sufficient for the days of competition in which we live, and when, instead of leaving the management of *large* woodlands to land agents, who have no time to fully pursue the matter theoretically and practically, such woods should be under specially trained foresters. To make these two colleges thoroughly efficient to teach forestry each should have attached to it at least some 500 acres of forest (some say 5,000

acres, or double that). The Surveyor's Institution is doing valuable work in examining and giving certificates in forestry and in establishing a forestry museum in London. We all know that at this period of the world's history to ensure success there must be division of labour, and if we are to grow timber to give us what we shall need when outside supplies are not forthcoming as they are now we must have trained men to manage our woods, and the sooner the better. It should be known that foreign supplies are not inexhaustible, and it may be said shortly that, taking the world as a whole, the area under trees is decreasing whilst the demand for timber is always on the increase. The population in America grows rapidly in numbers, and supplies there will have to be kept at home. We now import some £18,000,000 worth of timber yearly, much of which could be raised at home without diminishing agricultural products, in fact the greater existence of forests increase the agricultural output.

Of course everyone knows that our islands, like nearly every other country, were in early days, with the exception of mountain tops, covered with trees from one shore to another.

These have been gradually cut and burnt away, and a reckless destruction of forests has taken place to the present day; on the other hand a good deal of planting must have taken place in England between about 1775 and 1825, as shown by the age of trees in existing plantations. In my early days, in the fifties and sixties, I lived close to woods in Somersetshire, on the outlying spurs of the Mendip Hills, that extended for some ten miles and were a mile or two broad; they were then composed of young trees that had evidently been planted shortly after the Battle of Waterloo. Those woods have been for the most part much neglected, there being no system of reproduction; but crops of coppice wood are regularly cut with care in some parts, and I have noticed in Devonshire that this branch of forestry seems to be in favour. I see some planting going on in the South of England, but on a limited scale. I see also great expanses of land lying almost useless that one would like to see re-afforested.

Our national forests at home are small compared with those held by private individuals, and contain some 115,293 acres, or about one-twentieth of the whole land under trees, of

which only 54,304 acres are under timber crops in the New Forest, the Forest of Dean, and the smaller State woods. There are great difficulties connected with the planting of open spaces in these forests on account of the rights of pasture of the commoners, which have to be and ought to be jealously respected and guarded; for no man of sense wishes to see the rural population of England further reduced. On the contrary, life in the country should be encouraged, so as to breed a hardy race of men, and for this reason, if for no other, there should be re-afforestation of land *unsuited for pasture and tillage* wherever it may be so long as it will grow trees and the trees will not favour malaria, as in marshes, which should be properly drained before being planted. If proper attention were given to the selection of trees for various soils, landowners would make a much greater success with their woods. This shows the great need they have of trained foresters. The re-afforestation of England, when it shall be undertaken, as it will have to be, will employ a large amount of labour, and many forest operations are carried out in the winter to the relief of the unemployed. When these new forests shall have been created

by our landowners, whether public bodies or individuals, they will provide constant work for many thousands of people, who will be able to live in prosperity. This is the experience of all people who have undertaken such work.

It is the fashion in these days to abuse landlords; all the same the public are under a deep debt of gratitude to those of them who, notwithstanding difficulties with assessment committees and the law of succession and entail, maintain grand forests, woodlands, and wooded parks and farms; for what would our beautiful England be without trees? The picture is too hideous to contemplate, much more than enough is to be seen of that in other lands, especially where lie those vast deserts of sand and rocks rendered barren by man's wasteful folly. It is a lamentable fact that in Ireland where under recent Acts of Parliament small owners of land have come into existence, they have at once set to work to cut down what trees remained standing; and I have noticed since the sale three or four years ago of a large estate in Somersetshire that I am well acquainted with individual farmers that have acquired their holdings are doing the same thing.

In Switzerland the woods belong to the people and are carefully looked after by different local authorities; you see placards announcing that certain marked trees in a wood belonging to a parish or commune are for sale by auction. How much it is to be regretted that most of our county district and parish councils in the British Islands are not possessed of woodlands and that the elements of forestry are not taught in every school throughout the land. Were things changed for the better in this direction the value of trees would be understood. Notwithstanding the Local Government Acts we continue in great measure to live under feudal laws and customs. London has set the example of acquiring forests and open spaces, and her lead should be followed throughout the kingdom. Take the case of Dartmoor, which should undoubtedly belong to the Devon County Council, and about which I have to speak on another occasion, were this in the hands of that body encroachments could be much more readily stopped than is now possible, and under proper powers from Parliament some useful replanting of the ancient forest undertaken.

Notwithstanding the apathy hitherto of the

English about forestry there are signs of improvement; the late Dr. James Brown's standard work *The Forester*, now edited by Dr. Nisbet, has run to the sixth edition, showing a demand for accurate knowledge on this subject. The Recess Committee, on the establishment of a department of agriculture and industries for Ireland, strongly recommended in 1896 the replanting of waste land in that country on a very large scale, and remarks that to carry out the work forestry experts will have to be imported from the Continent. It is humiliating and unworthy of a great nation that we shall need such external aid, still we must have it, and it is encouraging to see that candidates for Parliamentary honours refer to the splendid work done by the Recess Committee. Further, the jaded Londoner, unsatisfied by the sea breezes, with broiling sun of the Sussex coast, seeks them in Hampshire where in and around Bournemouth are plenty of shady walks and drives.

The study of forestry shows that it is or ought to be most intimately associated with the high policy of nations. It is our true duty in Africa to preserve the great forests in the interior of that continent from wanton



destruction, and to reclaim the deserts of Egypt and Rhodesia by steadily and persistently planting trees, starting in the first place up the dry water-courses that lead down to the Nile and to the open rivers in South Africa. Trained foresters for this should be obtainable from the Indian establishment. Schools of forestry should be established at Khartoum and Buluwayo.

Lastly, after what I have seen in Germany, France, and other countries, and have failed to see in my own, let me say this, and I am sorry to say it, that generally so loose and careless are our methods, there is such a want of system in the management of our woods, and such a dearth of duly-qualified men as upper foresters, that it amounts to this, English forestry can hardly be said to exist, it has to be created.

As regards Scotland things are much better there. Some of the great private forests are in charge of practical men that have been in the woods all their lives, where forestry is practised according to the best methods. These men, although teachers of the practice of their profession, and who (some of them) form an examining board in Edinburgh, at once say

they have much felt the want of a theoretical training themselves, have had to read much, and would welcome the establishment of a Forest School which *might* be connected with an Agricultural College, and would much assist towards the improved management of the smaller forests.

The "sensibility" of the "Irish members" rather hinders my suggesting anything about their country, but I may, perhaps, say this, that they have now got their Local Government Act, and let us hope they will make a good use of it, that the Local Councils will set to work and get possession of all the waste land they possibly can, and replant and maintain the forests; this will give employment to many idle hands, and in 15 years' time there will be some return for the money expended. After 25 years there will be a full return, many new industries will be established, agriculture will be improved, and Ireland will enter upon a period of great and lasting prosperity.

In Wales, according to the evidence before the Committee, there was probably a larger area of unplanted land that would pay for planting than in any other portion of the kingdom.

Those that have done the writer the honour of reading the foregoing pages will, I hope, see that forestry is a subject of the very highest importance. It is worthy the attention of great men; it enables us to read with accuracy the past history of the world; it also enables us to look into the future; it shows how the pillars of the earth have been shaken and thrown down, and how they can and will be rebuilt and re-erected.





